



STEVAL-TDR027V1

Portable UHF 2-way radio demonstration board
based on the PD84008L-E

Features

- Excellent thermal stability
- Frequency: 380 - 512 MHz
- Supply voltage: 7.2 V
- Output power: > 6 W
- Power gain: 11.7 ± 0.5 dB
- Efficiency: 46% - 71%
- Load mismatch: 20:1 all phases
- BeO-free amplifier

Description

The STEVAL-TDR027V1 demonstration board is a portable UHF 2-way radio designed as a platform for evaluating the performance of the PD84008L-E LDMOS RF power transistor.

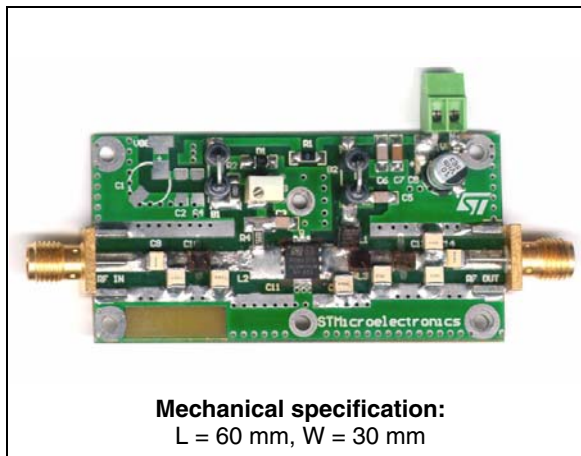


Table 1. Device summary

| Part number |
|-----------------|
| STEVAL-TDR027V1 |

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1 Electrical characteristics

$T_A = +25\text{ }^{\circ}\text{C}$, $V_{DD} = 7.2\text{ V}$, $I_{dq} = 200\text{ mA}$

Table 2. Electrical specification

| Symbol | Test conditions | Min | Typ | Max | Unit |
|------------------|---|-----|------------|------|------|
| Freq | Frequency range | 380 | | 512 | MHz |
| P _{OUT} | @ P _{IN} = 27 dBm | 6 | | | W |
| Gain | @ P _{IN} = 27 dBm | | 11.7 ± 0.5 | | dB |
| ND | @ P _{IN} = 27 dB | | 46 - 71 | | % |
| H2 | 2nd harmonic @ P _{IN} = 27 dB | | -38 / -70 | | dBc |
| H3 | 3rd harmonic @ P _{IN} = 27 dB | | -60 / -70 | | dBc |
| VSWR | Load mismatch all phases @ P _{OUT} = 6 W | | | 20:1 | |

2 Impedance

Figure 1. Impedance diagram

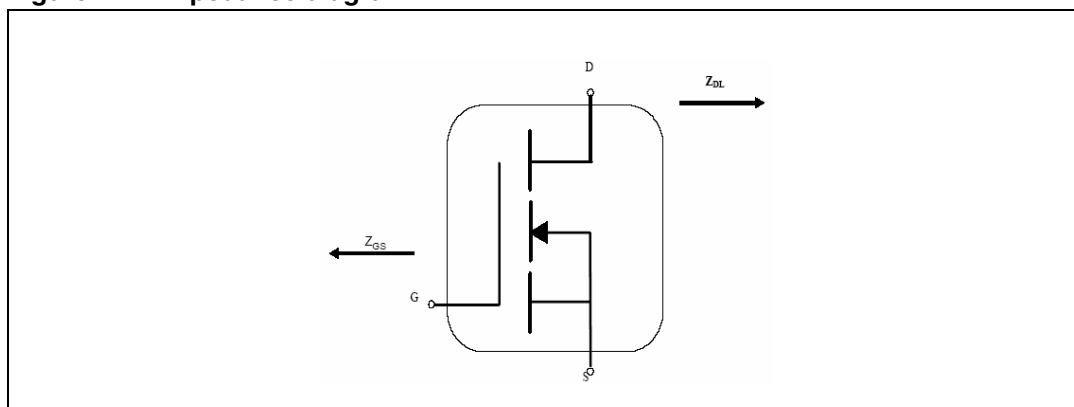


Table 3. Impedance data

| F (MHz) | Z_{GS} | Z_{DL} |
|---------|--------------|--------------|
| 380 | $3,3 + j6,2$ | $2,2 - j0,7$ |
| 390 | $3,6 + j6,7$ | $2,2 - j0,4$ |
| 400 | $4,1 + j7,1$ | $2,2 - j0,1$ |
| 410 | $4,6 + j7,4$ | $2,2 + j0,2$ |
| 420 | $5,3 + j7,5$ | $2,2 + j0,5$ |
| 430 | $6,2 + j7,3$ | $2,3 + j0,8$ |
| 440 | $6,8 + j6,6$ | $2,4 + j1,0$ |
| 450 | $7,0 + j5,4$ | $2,4 + j1,3$ |
| 460 | $6,4 + j4,2$ | $2,6 + j1,5$ |
| 470 | $5,2 + j3,6$ | $2,7 + j1,6$ |
| 480 | $3,9 + j3,7$ | $2,8 + j1,7$ |
| 490 | $2,8 + j4,2$ | $2,9 + j1,8$ |
| 500 | $2,1 + j4,9$ | $3,0 + j1,9$ |
| 510 | $1,6 + j5,6$ | $3,1 + j1,8$ |
| 520 | $1,3 + j6,3$ | $3,2 + j1,7$ |

3 Typical performance

Figure 2. Output power and efficiency vs. frequency (pin=27 dBm)

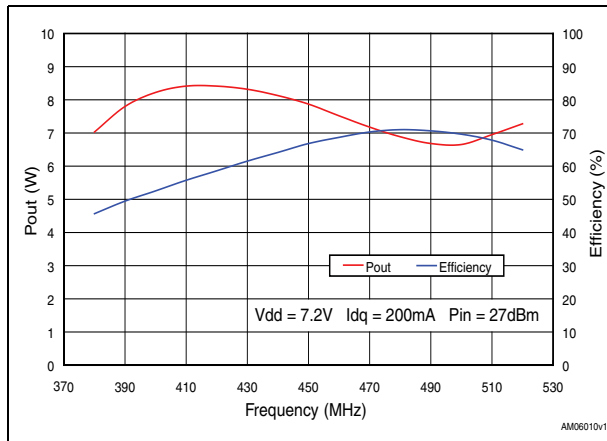


Figure 3. Output power and efficiency vs. frequency (pin=28 dBm)

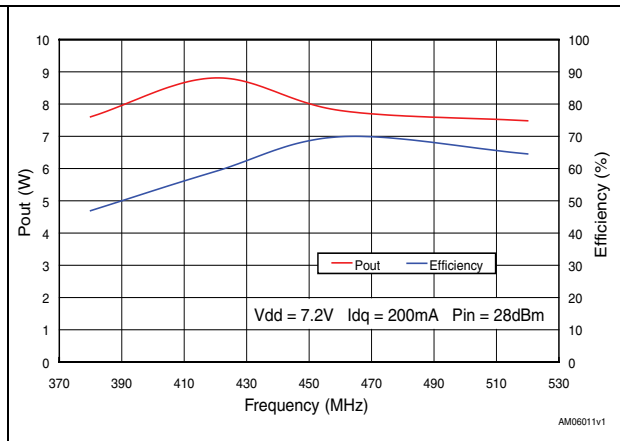


Figure 4. Gain vs. frequency

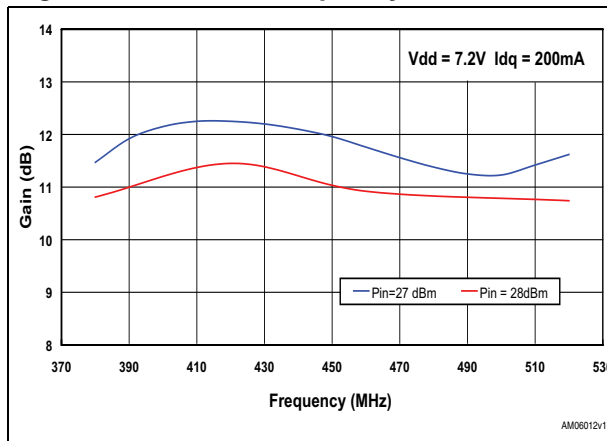


Figure 5. Gain vs. Pout

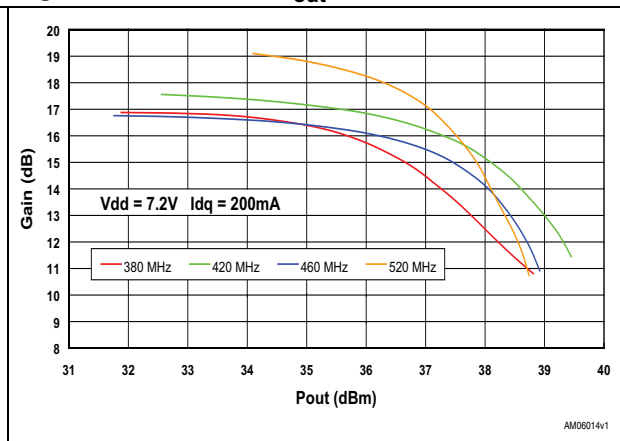


Figure 6. Input return loss vs. frequency

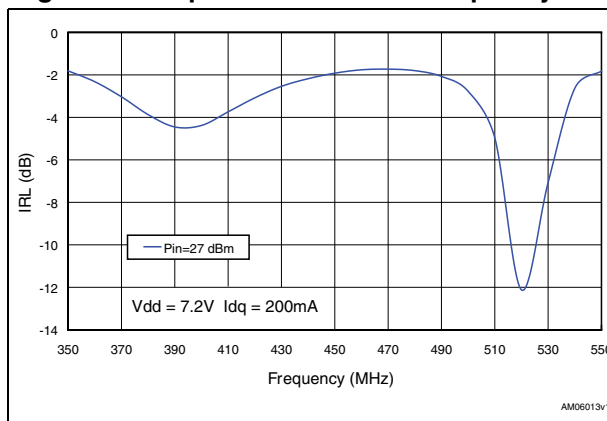


Figure 7. Drain current vs. output power

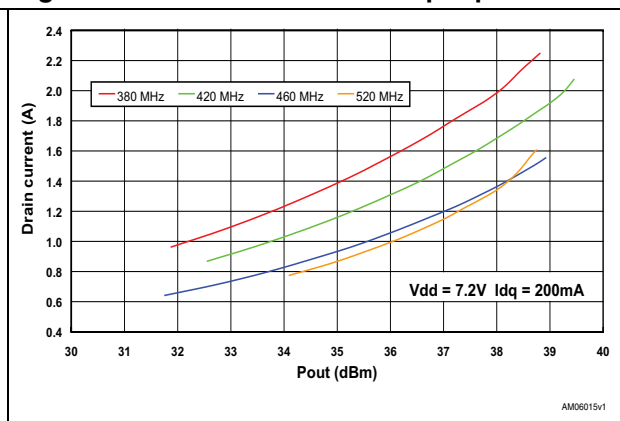
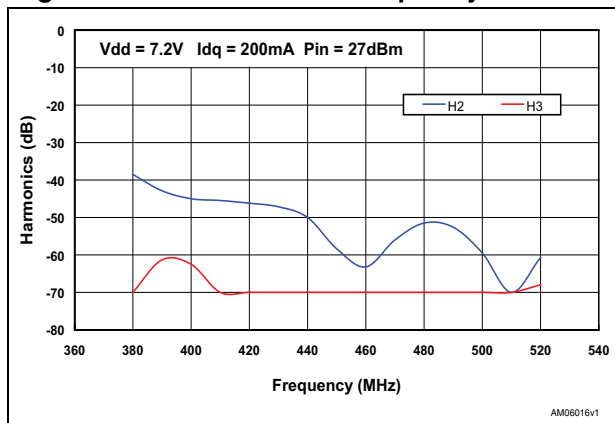


Figure 8. Harmonics vs. frequency

4 Test circuit

Figure 9. Test circuit schematic diagram

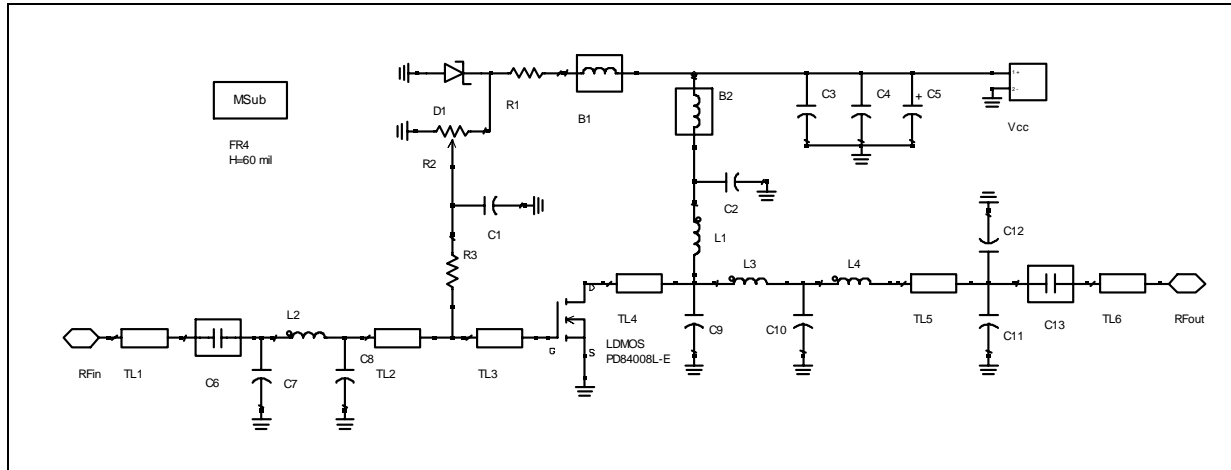


Table 4. Component list

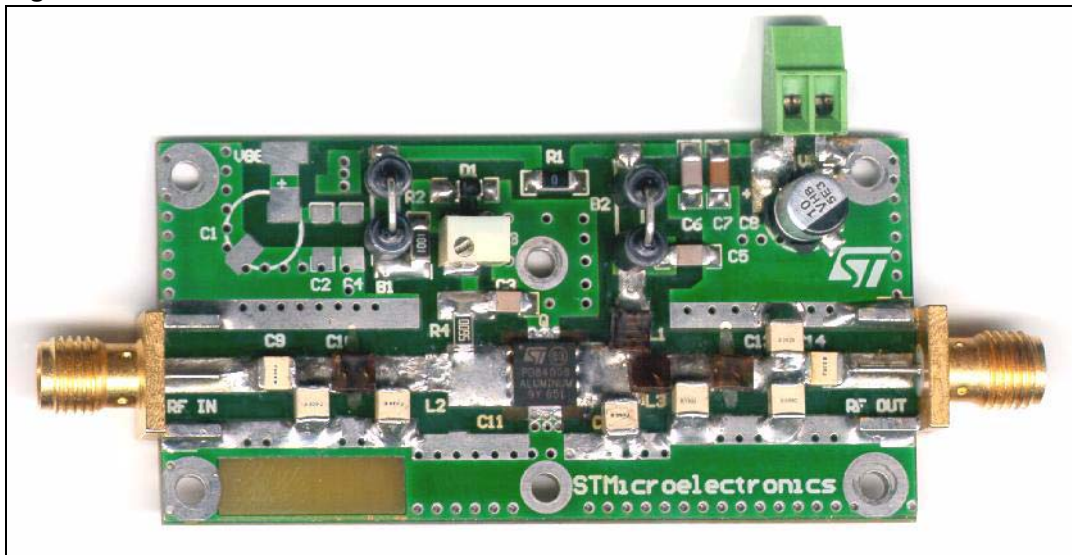
| Component ID | Description | Value | Case size | Manufacturer | Part code |
|--------------|--------------|---------|-----------|------------------|----------------------|
| B1 | Ferrite bead | | | Panasonic | EXCELDRC35C |
| B2 | | | | Panasonic | EXCELDRC35C |
| C1, C2 | Capacitor | 120 pF | 1206 | MURATA | GRM42-6 COG 121J 50_ |
| C3 | | 1 nF | 1206 | MURATA | GRM42-6 COG 102J 50 |
| C4 | | 100 nF | 1206 | MURATA | GRM42-6_X7R 104K 50_ |
| C5 | | 10 uF | SMT | Panasonic | EEVHB1V100P |
| C6, C13 | | 33 pF | 100B | ATC | ATC 100B 330JW |
| C7 | | 22 pF | 100B | ATC | ATC 100B 220JW |
| C8 | | 47 pF | 100B | ATC | ATC 100B 470JW |
| C9 | | 39 pF | 100B | ATC | ATC 100B 390JW |
| C10 | | 15 pF | 100B | ATC | ATC 100B 150JW |
| C11 | | 6.8 pF | 100B | ATC | ATC 100B 6R8BW |
| C12 | | 2.2 pF | 100B | ATC | ATC 100B 2R2BW |
| D1 | Zener diode | 5.1 V | SOD110 | Philips | BZX284C5V1 |
| L1 | Inductor | 18.5 nH | | Coilcraft | A05T |
| L2 | | 5 nH | | Coilcraft | A02T |
| L3, L4 | | 2.5 nH | | Coilcraft | A01T |
| R1 | Resistor | 1 kΩ | 1206 | Tyco Electronics | 01623440-1 |

Table 4. Component list (continued)

| Component ID | Description | Value | Case size | Manufacturer | Part code |
|--------------|-----------------------------------|---------------|-----------|--------------------|--------------|
| R2 | Potentiometer | 10 k Ω | | Bourns Electronics | 3214W-1-103E |
| R3 | Resistor | 560 Ω | 1206 | Bourns Electronics | |
| TL1 | Transmission line | W=2.87 mm | L=7.4 mm | | |
| TL2 | | W=2.87 mm | L=5.0 mm | | |
| TL3 | | W=4.98 mm | L=4.8 mm | | |
| TL4 | | W=4.98 mm | L=4.0 mm | | |
| TL5 | | W=2.87 mm | L=1.5 mm | | |
| TL6 | | W=2.87 mm | L=6.1 mm | | |
| PD84008L | LDMOS | | | STMicroelectronics | PD84008L-E |
| Board | FR-4 THk=0.060" 2OZ Cu both sides | | | | |

5 Board photo

Figure 10. STEVAL-TDR027V1 demonstration board



6 Revision history

Table 5. Document revision history

| Date | Revision | Changes |
|-------------|----------|------------------|
| 18-Oct-2010 | 1 | Initial release. |

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